

Green Hydrogen – A fuel of the future

The potential role of hydrogen technologies in global decarbonisation efforts is well-recognised, but market challenges have prevented widespread uptake of these technologies in the past. Today, however, the unprecedented alignment of techno-economic solutions, environmental urgency, and political influence has successfully turned greater investment attention toward this new fuel.

The prospects that lie in the hydrogen space offer The NGC Group an opportunity to seek new markets and products aligned towards a nascent growth area – decarbonised petrochemicals – which can be a powerful platform upon which we build a sustainable Group and national future.

WHY HYDROGEN?

Hydrogen is a clean fuel whose sole by-product when burned is water. It can be produced from fossil fuels such as natural gas or coal through thermal processes, or from renewable sources such as solar and wind power.

For T&T, there is an obvious opportunity to produce hydrogen and utilise it as feedstock in the country's well-established petrochemical sector, displacing hydrogen produced from natural gas. Beyond the industrial sector, hydrogen could provide a possible avenue to transition towards clean mobility as the transportation sector shifts from gasoline and CNG towards electric driving, both with batteries and fuel cells powered by hydrogen. Establishment of a hydrogen production complex in T&T could also kickstart a regional industrial cluster that would complement Caribbean decarbonisation efforts.

In the 2019/2020 National Budget Presentation, the Minister of Finance indicated that the State was desirous of exploring different hydrogen applications within the local economy and encouraging collaborations with the private sector, academia, and international organisations.

In support of the Government's stated policy position, NGC Group subsidiary National Energy has initiated work to identify opportunities for applying renewables-based hydrogen locally. These efforts will be the basis for the decarbonisation of the existing petrochemical industry and difficult-to-decarbonise sectors, such as the cement and metals industries.



PILOTING FOR A HYDROGEN ECONOMY

A modular, purely green hydrogen facility can be a precursor to establishing a green hydrogen economy. A pilot would serve to advance a hydrogen economy along the most effective path and confirm proof of concept concerning the application of renewable energy (RE) technology for hydrogen production in the local context. A pilot project would also:

- Allow for the identification of the best RE technology for power generation to produce hydrogen
- Lower the risks for entrepreneurial investments through the provision of relevant baseline data, specific to the T&T context
- Encourage further technology development and private sector participation through access to data from a local pilot plant.

Establishing a pilot green hydrogen facility will also provide an avenue to link various stakeholders such as the State and private sector. Valuable data would be made available for reference to complement other sustainable energy programmes and inform policy development to facilitate the growth of a hydrogen economy in Trinidad and Tobago.

The expansion of a Trinidad facility would in turn support regional cluster formation. Hubs and clusters can link production, industrial demand, consumer demand, storage, usage, and trading workforce in a small, centralised, focused area. In this way, a Caribbean hydrogen cluster can contribute to a stronger regional energy ecosystem, strengthen economic growth, improve regional transportation, and boost economic integration.

Potential areas for investment along the hydrogen value chain are as follows:

- As new power generation capacity is needed, investors will seek to develop wind, solar, geothermal, biomass, and other forms of renewable and clean energy sources to satisfy demands.



- Transportation of power from the power generation sites to the hydrogen production facilities throughout the islands will require infrastructural investments. Trinidad's existing gas infrastructure and any new infrastructure to enable gas-fired power generation throughout the region could represent considerable infrastructure-in-place for integrating green hydrogen.
- From a storage perspective, hydrogen can go where batteries cannot facilitate long-term energy storage of clean energy. Energy storage can be attractive business cases for Caribbean grids, improving grid reliability and resilience against power shortages and outages. Additionally, as prices decline, a hybrid solution (batteries and hydrogen) coupled with solar generation can yield an attractive business case for Caribbean grid operators to integrate hydrogen into the energy mix with storage options in Trinidad and Tobago and elsewhere.
- A suite of sub-sectors can potentially be built with renewable or green hydrogen as the feedstock on the downstream end. The Caribbean is also a large hotel and cruise tourism region. A hydrogen cluster in the area can generate innovative solutions within the global tourism industry, with the Caribbean as the first-mover.

NGC GROUP HYDROGEN AGENDA

Given all these potential benefits and opportunities, and with support from the Ministry of Energy and Energy Industries (MEEI) and the Ministry of Planning and Development (MPD), National Energy secured funding from the Inter-American Development Bank

(IDB) under an IDB-executed non-reimbursable Technical Cooperation Promotion of the Green Hydrogen Market in Latin America and Caribbean (LAC) Countries. This funding will allow for feasibility studies to be conducted in 2021 that contribute to understanding the economic parameters of producing green hydrogen locally.

To maximise The Group's contribution in this new research and development area, the organisation has invested in building employee capacity in the clean hydrogen space.

The Group is also partnering with other companies on this agenda. In January 2021, NGC and National Energy signed a Memorandum of Understanding (MOU) with Kenesjay Green Limited (KGL) to work collaboratively on the creation of a sustainable hydrogen economy for the energy sector of Trinidad and Tobago. Under the MOU, parties will explore potential areas of cooperation for the development of hydrogen and energy efficiency-related projects. One such initiative is the country's first carbon neutral industrial plant being spearheaded by KGL subsidiary NewGen. The NGC Group is currently playing a supportive role in this project through investment facilitation on the ttEngage platform.

FUEL OF THE FUTURE

As a state-owned enterprise, The NGC Group is well-positioned to support the country's pursuit of a hydrogen economy, through the establishment of a pilot green hydrogen facility, and facilitation of other hydrogen research and projects. With the right partnerships, investment and policy frameworks, this fuel of the future can launch Trinidad and Tobago into a position of leadership in the global clean energy space.

AT THE FOREFRONT OF *Energy*